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| BURKHART, ELIZABETH A | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/516,448

Applicant(s)

WARD, LUKE

Examiner

Elizabeth Burkhart

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 3-12, 15-23, 25, 26, 28 and 31-35 is/are pending in the application.
- 4a) Of the above claim(s) 32 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 33-35 is/are allowed.
- 6) ☒ Claim(s) 1, 3-12, 15, 17-23, 25, 26, 28 and 31 is/are rejected.
- 7) ☒ Claim(s) 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 11/10/09.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1, 3-12, 15-23, 25, 26, 28, and 31-35 are pending in the application.

Claim 32 has been withdrawn from consideration. The amendment filed 10/21/2009 has been entered and carefully considered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-12, 15, 17-21, 25, 26, 28, and 31 are rejected under 35 U.S.C.

103(a) as being unpatentable over Goodwin et al (WO 02/28548) in view of Badyal et al (WO 98/58117).

Goodwin discloses a method for depositing a coating on a substrate by introducing an atomized coating forming material into an atmospheric pressure plasma discharge prior to being deposited onto a substrate ([0005]). The plasma discharge retains the chemical properties of the atomized coating forming material ([0018]). The atomizer is connected to a syringe pump for supplying coating forming monomer to said atomizer ([0022]). The plasma discharge is created by any conventional means of generating a glow discharge, which is a flux of ionized particles ([0009]). The substrate is located inside the plasma discharge during coating deposition ([0008]). The substrate may be any material (e.g. metal, ceramic, polymer, woven or non-woven fibers, natural fibers, synthetic fibers, cellulosic material and powder) ([0016]). The coating forming

monomer material may be solid, liquid, gaseous, organic or inorganic or mixtures thereof ([0011]). The atomizer may be an ultrasonic nozzle ([0022]) wherein the coating material is a liquid or liquid/solid slurry ([0005]). A plurality of atomizers may be used ([0010]). Goodwin also discloses a method of producing a multilayer coating on a substrate by exposing the substrate to the excited coating forming material repeatedly [0019] and that the coating may be post-treated or pre-treated by exposure to an exciting medium [0013].

Goodwin does not disclose that the plasma discharge is pulsed.

Badyal discloses a method of coating a surface with a polymer layer using a pulsed plasma discharge in order to achieve a greater level of structural retention (pg. 9, lines 22-29).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use the method of Goodwin wherein the plasma discharge is pulsed as suggested by Badyal in order to achieve a greater level of structural retention.

Regarding Claim 1, the plasma sources of Goodwin would serve to chemically activate the coating forming material. Goodwin discloses using monomers or oligomers for the coating material [0011], thus the plasma would inherently form monomer radicals, ions or oligomers.

Regarding Claim 5, it would have been obvious to incorporate a vacuum chamber into the process of Goodwin et al. because it was well known in the art to use a vacuum chamber to deposit gaseous or vapor coating forming materials onto a substrate in plasma surface treatments (Goodwin et al. [0004]). Also, Badyal discloses

that suitable pulsed plasmas for their invention may operate at atmospheric or sub-atmospheric pressures (p. 5, lines 14-17).

Regarding Claims 6 and 8, Goodwin discloses adding additional materials to the atomized coating material, such as oxygen, to form an oxygen containing coating [0012].

Regarding Claim 7, the oxygen flow of Goodwin as discussed above would act to carry the atomized material to the substrate to form the oxygen containing coating thereupon.

Regarding Claim 9, Goodwin discloses that multilayer coatings may be formed by repeatedly passing the substrate through the chamber [0019] and that oxygen containing coatings may be formed under oxidizing conditions and oxygen free coatings formed under reducing conditions [0012]. Therefore, it would have been obvious to one of ordinary skill to pulse the additional material in order to form multilayer coatings having oxygen containings layers and oxygen free layers.

Regarding Claim 26, Goodwin discloses the same substrate material and the same coating forming material, thus the coated substrate would be subject to derivatization.

Regarding Claim 31, since the coating material may be a liquid rather than a suspension of particles within a carrier liquid, the plasma discharge would contain the coating material in the absence of other materials.

Thus, claims 1, 3-12, 15, 17-21, 25, 26, 28, and 31 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Goodwin and Badyal.

3. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin et al. (WO 02/28548) in view of Badyal et al (WO 98/58117) as applied above and further in view of Vaartstra et al ('126).

Goodwin and Badyal do not disclose that the atomizer is a nebulizer supplied with coating material in a liquid or liquid slurry and a carrier gas.

Goodwin does however teach that the coating material may be atomized by any conventional means [0010].

Vaartstra discloses that an ultrasonic nebulizer may be used for atomizing a coating material for a vapor deposition process (Col. 5, lines 1-22).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use a nebulizer as suggested by Vaartstra in the process of Goodwin since Goodwin discloses that suitable atomizers are ultrasonic nozzles from Sono-Tek which includes the nebulizer of Vaartstra.

Thus, claim 22 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Goodwin, Badyal, and Vaartstra.

4. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Goodwin et al. (WO 02/28548) in view of Badyal et al (WO 98/58117) as applied above and further in view of Ruta et al ('647) and Bailey.

Goodwin and Badyal do not disclose that the atomizer is a plain-jet gas blast atomizer supplied with coating material in the form of a powder and a carrier gas.

Goodwin does however teach that the coating material may be atomized by any conventional means [0010].

Ruta discloses atomizing a liquid composition which may be in the form of a solution, slurry, or multiphase composition by using a plain jet air blast atomizer to form a coating. The liquid composition may be monomeric, oligomeric, or polymeric (Col. 1, lines 10-35, Col. 9, lines 30-50).

Bailey discloses that air blast atomizers may also atomize powders (p. 1347, Col. 2).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use a plain jet air blast atomizer as suggested by Ruta and Bailey in the process of Goodwin since Goodwin discloses atomization by any conventional means, the same types of coating materials to be atomized as disclosed by Ruta, and that the coating material may be in the form of solid, liquid, or combinations thereof.

Thus, claim 23 would have been obvious within the meaning of 35 USC 103 over the combined teachings of Goodwin, Badyal, Ruta, and Bailey.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct

from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 1, 4-12, 15-18, 20-23, and 33-35 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 5-11, 14-21, 25, and 26 of copending Application No. 10/514661 in view of Goodwin et al (WO 02/28548).

The '661 claims do not disclose that the substrate is located inside the exciting medium during coating deposition.

Goodwin discloses a similar coating process wherein the substrate is placed within the exciting medium, but the size of the substrate is limited to the volume of the plasma region [0016]. It would have been obvious to one of ordinary skill in the art at the time of invention by applicant that the substrate of the '661 claims may alternatively be placed within the exciting medium as suggested by Goodwin as long as it is of an appropriate size.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Allowable Subject Matter

6. Claim 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
7. Claims 33-35 are allowed.

The following is a statement of reasons for the indication of allowable subject matter: The relevant prior art does not disclose forming a multilayer coating wherein the nature of the exciting medium is changed during the coating formation (i.e. pulsed plasma to pulsed UV). The relevant prior art states that for a multilayer coating multiple plasma chambers may be used, but not the use of a plasma chamber followed by a UV or electron beam chamber.

Response to Arguments

8. Applicant's arguments filed 10/21/2009 have been fully considered but they are not persuasive. Applicant argues that the mechanism of deposition in the present invention is completely different to that disclosed in Goodwin and Badyal because in the current invention there is atomized liquid which either becomes activated during the plasma on-period of plasma pulsing or is activated by the plasma on-period after impinging the substrate during a plasma off-period. Applicant argues that since Goodwin doesn't teach a pulsed plasma and Badyal doesn't teach atomized liquid, the mechanism of each is different than the present invention. The examiner disagrees. Goodwin discloses the same process as the present invention including atomizing the coating liquid forming material and activating said material using plasma. The only

difference between Goodwin and the claimed invention is Goodwin doesn't teach a pulsed plasma. However, Badyal discloses depositing the same types of coating materials as Goodwin using a pulsed or continuous plasma, wherein the pulsed plasma results in a greater level of structural retention (Col. 4, lines 29-56), which is the same advantage disclosed in the present invention for using a pulsed plasma. Since Badyal discloses advantages to using a pulsed plasma to deposit the same coating materials of Goodwin, it would have been obvious to one of ordinary skill in the art to incorporate Badyal's pulsed plasma into Goodwin's process to achieve the greater level of structural retention.

Applicant further argues that there is no suggestion in Badyal that pulsing of the plasma would have a beneficial effect for atomized liquid coating formation of Goodwin. The examiner disagrees. As discussed above, since Badyal discloses advantages (i.e. greater structural retention) for using pulsed plasma in the deposition of the same type of coating materials as Goodwin, one of ordinary skill in the art would have been motivated to use a pulsed plasma in the process of Goodwin to achieve these advantages, regardless of how the coating material is introduced to the chamber, since atomizing the coating materials doesn't change its properties.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Burkhart whose telephone number is (571)272-6647. The examiner can normally be reached on M-Th 7-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on 571-272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Elizabeth Burkhart/
Examiner, Art Unit 1792

/Timothy H Meeks/
Supervisory Patent Examiner, Art Unit 1792